

Abstract

A polymer-based field effect transistor photosensitive to incident light, which may enhance the transistor's characteristics and controlling parameters of the transistor state. The transistor is comprised of a metal-insulator-semiconductor structure with the insulating and semiconducting layers made of a polymeric media. The semiconducting polymer which also is photoconducting, forms the charge transport layer between the source and drain. The transistor exhibits large photosensitivity indicated by the sizable changes in the drain-source current, by a factor of 100-1000 even at low levels of light with illumination of approximately 1 mlux. The photosensitivity of the transistor is further enhanced with introduction of dilute quantity electron acceptor moieties in the semiconducting polymer matrix. Several applications of the light-responsive polymer-transistor are disclosed, such as use as a logic element and as a backbone of an image sensor.

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